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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,750	08/30/2001	Charles A. Howland	W0490/7026 RJP	8463

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MAINE & ASMUS
100 MAIN STREET
P O BOX 3445
NASHUA, NH 03061-3445

EXAMINER	
FISCHER, JUSTIN R	

ART UNIT	PAPER NUMBER
1733	

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/943,750	HOWLAND ET AL.	
	Examiner	Art Unit	
	Justin R Fischer	1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,12-14,17,19-21,23-30,33,35,36,40-44,47-53 and 134* is/are pending in the application.

4a) Of the above claim(s) *1-8,12-14,17,19-21,23-26 and 53* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *27-30,33,35,36,40-44,47-52 and 134* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 12, 2004 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 27-30, 35, 36, 40-44, 47-52, and 134 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGee (US 5,785,779, of record) in view of RD '421059 (of record), Harpell (US 5,198,280, of record), Harpell (US 4,623,574, of record), and Howland (US 6,266,818). McGee, RD '421059, and Harpell '280 are applied in the same manner as set forth in the Final Rejection mailed on June 22, 2004.

As best depicted in Figures 1 and 2, McGee teaches a tire construction comprising a tire liner 20, wherein said tire liner is formed of a puncture resistant device 46 and a plastic covering layer 45 (Column 3, Lines 45-55). McGee further teaches that the puncture resistant strip is formed of "tightly woven" fabric layers (Column 4, Lines

32-35) and while McGee fails to expressly describe the round packed factor of the fabric layers, one of ordinary skill in the art at the time of the invention would have recognized the language "tightly woven" to suggest that the fabric does not contain a large amount of interstices and thus would have a round packed factor (measure of fabric fullness) in accordance to the broad range of the claimed invention. RD '421059 has been applied to evidence the association of a "tightly woven" fabric with a round packed factor or fabric tightness factor in accordance to the limitations of the claimed invention (discloses a value of greater than 0.75). Thus, it would have been obvious to form the fabric layers of McGee with a round packed factor as defined by the claimed invention, especially in view of the description of the fabric layers as "tightly woven" by McGee. As to the tenacity of the fibers, McGee suggests the use of a wide variety of fiber materials and further details a plurality of patents that describe suitable puncture resistant materials, including materials having a tenacity below 15 grams per denier. For example, Harpell '280 is one of the noted patents in which preferred fiber materials have a tenacity of at least 10 grams per denier (Column 5, Lines 32-37). It is further noted that one of ordinary skill in the art at the time of the invention would have been able to appropriately select the fiber materials depending on the specific tire being manufactured and desired level of puncture resistance (as needed). Thus, one of ordinary skill in the art at the time of the invention would have found it obvious to select a fiber material having the claimed tenacity in the construction of the puncture resistant device of McGee.

Regarding the claimed coating, while McGee does suggest that an epoxy may be applied to the woven fabric so as to provide increased puncture resistance (Column 4, Lines 40-48), the reference fails to expressly define the bulk modulus of such a coating. In any event, one of ordinary skill in the art at the time of the invention would have been able to appropriately select the desired modulus of the epoxy such that it satisfied the broad range of the claimed invention. It is noted that McGee describes a wide variety of puncture resistant materials, including those that are flexible and puncture resistant, wherein a flexible fabric is consistent with the use of an epoxy coating that does not have a relatively high modulus. It is additionally noted that Harpell '574 (Column 3, Lines 50-68) evidences the use of low modulus, epoxy coatings (below 6,000 psi) in the manufacture of ballistic resistant composite articles- this information is pertinent since McGee similarly describes the applicability of ballistic composite articles as the puncture resistant composite in the tire of McGee. Thus, in view of (a) the general suggestion of McGee to include an epoxy coating, (b) the broad range of the claimed invention, (c) the description of a "flexible and puncture resistant material" by McGee, and (d) the recognition, as evidenced by Harpell '574, that the claimed coatings are incorporated into ballistic composite articles, which are expressly suggested by McGee, one of ordinary skill in the art at the time of the invention would have found it obvious to use a coating having a bulk modulus lower than 10,000 psi absent any conclusive showing of unexpected results.

In regards to the "saturation" of the fiber bundles, McGee teaches that the puncture resistant device "may include an epoxy coated so as to be resistant to

punctures". A fair reading of this language suggests that the epoxy is applied in a manner that provides improved puncture resistance- the term "coated" does not appear to limit the application to surface coating of the fabric but rather it generically defines the ability to use the known methods of applying epoxies to fabrics in order to obtain improved puncture resistance. In this instance, both surface coating and saturation/impregnation are extremely well known "coating" methods designed to improve puncture resistance, as shown for example by Howland (Column 8, Lines 28-35). One would expect saturation coating to provide more puncture resistance, as compared to surface coating, since the fabric material becomes embedded within a matrix, fills the interstices, and defines an integral assembly (resin content is greater), as compared to surface coating in which the interstices are present. In light of this recognition, the results of the declaration are not seen to be unexpected. Thus, one of ordinary skill in the art at the tine of the invention would have found it obvious to form the puncture resistant device/layer of McGee as a saturated layer (represents form of generic "coating").

As to claim 28, the bulk density is a measure of the mass of the fibers in relation to the volume of the fabric. Since the fabric of McGee is "tightly woven", one of ordinary skill in the art at the time of the invention would have expected the number of interstices to be extremely low and as such, the bulk density of the fabric would not be significantly different from the density of the fiber materials. It is noted that the claim requires the ratio of the bulk density to the density of the fiber materials to be at least 20 percent. Thus, one of ordinary skill in the art at the time of the invention would have readily

appreciated and expected the fabric of McGee to satisfy the claimed quantitative relationship.

Regarding claim 29, the covering layer 45 of McGee is specifically provided to prevent abrading between the puncture resistant layer and inner tube and as such, one of ordinary skill in the art at the time of the invention would have expected the covering layer to have the claimed abrasion limit, absent any conclusive showing of unexpected results.

With respect to claim 30, the woven fabric layers of McGee are arranged to form a "puncture resistant" strip- one of ordinary skill in the art at the time of the invention would have readily appreciated and expected the strip to provide sufficient puncture resistance and satisfy the relationship of the claimed invention. It is emphasized that this is the function of the strip, to provide puncture resistance. Furthermore, the degree of puncture resistance is a function of the number of layers and the fiber materials and would be dependent on the type of tire being manufactured.

As to claims 35 and 36, the discussion above regarding the description of the fabric as "tightly woven" is applicable. It is emphasized that the language "tightly woven" is generally associated with a woven fabric structure having a round packed cover factor of fabric tightness factor as defined by the claimed invention. Furthermore, since the fabric is designed to be puncture resistant, one of ordinary skill in the art at the time of the invention would have expected the fabric to have a limited number of interstices (weak points of fabric wherein nails, stones could enter).

Regarding claims 40 and 41, McGee suggests a plurality of woven fabric layers to define the puncture resistant device (Column 4, Lines 32-34), wherein said layers are adjacent/bonded to one another.

As to claims 42 and 43, the strip 20 composed of a covering layer and a puncture resistant device is configured to be insertable within a tire. As depicted in Figure 1, the strip is bonded to the inner surface of the tire.

With respect to claim 44, while Harpell '280 fails to expressly describe the inclusion of the puncture resistant device within the body of the tire, these embodiments are extremely well known in the tire industry as being equivalent alternatives. For example, RD '421059 specifically describes a similar, tightly woven fabric structure as being suitable on the inside of the tire or as a component within the body of the tire. Thus, one of ordinary skill in the art at the time of the invention would have readily appreciated the arrangement of the fabric of McGee within the tire as it represents a well known arrangement for such puncture resistant structures, it being further recognized that the tire industry recognizes the arrangement of such structures both within the tire body and within the tire cavity.

Regarding claims 47-50, as previously stated, the specific properties of the fiber materials used to form the woven fabric would be dependent on the type of tire being manufactured, the additional reinforcement present, and the amount of reinforcement needed. The claimed tenacity ranges are consistent with materials that are commonly used in puncture resistant devices, such as polyamides (nylon) and polyesters. As

stated above, these materials represent suitable fibers for the woven fabric of McGee in view of Harpell.

Regarding claim 51, while McGee fails to expressly describe the denier of the fiber materials, the claimed values are consistent with those commonly used in the tire industry. It is noted that McGee suggests a wide variety of materials, including those described by Harpell. In this instance, Harpell '280 describes a preferred fiber denier between 10 and 400, which is extremely similar to that disclosed by the claimed invention (Column 5, Lines 50-60). One of ordinary skill in the art at the time of the invention would have been able to appropriately select the denier of the fiber material depending on the type of tire being manufactured and the necessary puncture resistance.

With respect to claim 134, the puncture resistance composite of McGee is positioned to extend around a periphery of the inner tube; thus, the composite of McGee is seen to constitute a continuous annular layer (Column 4, Lines 5-12).

4. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over McGee, RD '421059, Harpell '280, Harpell '574, and Howland as applied in claim 27 above and further in view of Verzocchi (WO 94/12566, of record). In describing the woven fabric structure, McGee suggests that an epoxy coating can be included to optimize the puncture resistance. While McGee fails to suggest the use of abrasive fillers or hard particles in the coating, such materials represent conventional additives that are extensively used in the tire industry when a high degree of reinforcement is desired. For example, Verzocchi (Page 2, Lines 5-9) suggests the inclusion of hard particles

within a tire component and suggests that such particles reduce the onset of tears, cuts, or perforations- these benefits are analogous to those provided by the puncture resistant device of McGee. It is further noted that Howland also recognizes the use of fillers and additional additives in resinous coatings designed for woven fabrics (Column 8, Lines 30-35). Thus, one of ordinary skill in the art at the time of the invention would have found it obvious to include abrasive fillers or hard particles in the coating of McGee as they represent conventional additives in a variety of tire formulations. It is noted that while these particles are abrasive, they do not directly contact the tire due to the presence of a plastic covering layer in an analogous manner to the claimed invention.

Response to Arguments

5. Applicant's arguments filed November 12, 2004 have been fully considered but they are not persuasive.

Applicant contends that the examiner has developed an improper rejection based on the broad nature of the claims. Contrary to this statement, the examiner's position was not that the claim as a whole was broad but rather that the range for the modulus (a single feature) was broad, particularly between 0 and 10,000 psi. This, in combination with the recognized use of such epoxy coatings with similar reinforcement structures (shown by Harpell '574), would have lead one of ordinary skill in the art at the time of the invention to use an epoxy coating having a modulus below 10,000 psi in the tire of McGee.

In this same regard, applicant argues that there is no teaching suggestion, or motivation to combine the art of Harpell with that of McGee '574. However, McGee

expressly suggests that the materials of the ballistic resistant composite articles of several Harpell patents are suitable for the puncture resistant device of McGee. Thus, Harpell recognizes the use of such epoxy coatings with the materials that are useable in the tire of McGee. While the patent noted above ('574) is not specifically mentioned by McGee, a fair reading of McGee suggests that the materials in the series of Harpell patents are suitable for the puncture resistant layer of McGee. It is emphasized that Harpell '574 is applied since it recognizes the use of low modulus epoxy compositions with anti-ballistic materials that are suitable for use in the tire of McGee. Thus, the differences in the manner in which the woven structures are formed (between McGee and Harpell) or any additional differences between the structures as a whole does not affect the combination set forth above- Harpell is not being applied to teach the use of the anti-ballistic composite article of Harpell in McGee.

Regarding the declaration, as noted above, the results are not found to be persuasive in that one would expect the saturated fabric to display a larger puncture resistance as compared to a coated, but not saturated, fabric given the same fabric and the same resinous composition. In particular, the greater resin content in the saturated fabric would be expected to provide improved puncture resistance- this is the case since a saturated fabric is formed by completely encapsulating or embedding the fabric within a matrix to define an integrated assembly. Applicant further argues that the results are unexpected in that the use of a coating having little puncture resistance would not be expected to provide vastly improved puncture resistance. However, the results (Examples 2 and 3) do not demonstrate that the reason for such an improvement is the

combination of a low modulus resin and a saturated structure but rather that the improvement is a result of using a saturated structure (only difference between examples 2 and 3 is the use of coating instead of saturation). As noted above, one would expect the saturated structure, which forms a matrix and defines an integrated assembly, to demonstrate better puncture resistance as compared to a coated structure (contains greater resin content) independent of the modulus of the resinous composition.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R Fischer** whose telephone number is **(571) 272-1215**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Blaine Copenheaver can be reached on (571) 272-1156. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Justin Fischer

December 9, 2004

BLAINE COPENHEAVER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700